

HAZARDOUS MATERIALS

STORAGE AND HANDLING HANDBOOK



Safety

Personal
Protection

Spill
Control

Rescue

Hazard
Precautions

Hazard
Recognition

Storage

Fire
Prevention

Environment
Protection



FLAMMABLE

ASSISTANCE TELEPHONE NUMBERS

FIRE

EMERGENCY SPILL

SUPERVISOR

FACILITY ENGINEER

MEDICAL

SAFETY AND HEALTH

ENVIRONMENTAL

DUTY OFFICER

OTHERS

DOD HAZARD CLASS 1 HOTLINE

- a) DOD Hazard Class 1 (Explosives) Only..... (703) 697-0218/0219
Ask for "Watch Officer"
- b) DOD Non-explosive Hazardous Materials Only..... (800) 851-8061
From a ship at sea, call..... (804) 279-3131
HOTLINE Information..... (804) 279-3630
- c) DOD Radioactive Material..... DLA (717) 770-5283
- d) For Hazardous Substance Spills Only
Hazardous Materials/Packaging questions:
 - HTIS Help Line..... (800) 848-HTIS
(800) 848-4847
 - or this web site..... <http://www.dscr.dla.mil/htis/htis.htm>

For further information contact:

DEFENSE LOGISTICS AGENCY
ATTN: J-3731
8725 John J. Kingman Road
Fort Belvoir, VA 22060-6221
(703) 767-6582

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DEFENSE LOGISTICS AGENCY
HEADQUARTERS
8725 JOHN J. KINGMAN ROAD
FORT BELVOIR, VIRGINIA 22060-6221

IN REPLY
REFER TO

DLA J-3
FOREWORD

August 2005

This handbook is designed to be carried in the pocket or displayed in the workplace as a handy source of information for all of us who work around hazardous materials. It is not a substitute for policy or regulations, but it is suitable for use in helping to achieve full compliance with laws on Occupational Safety and Health, Environmental Protection, Storage and Handling and Radiation Safety. It is particularly useful in reinforcing local training programs and standard operating procedures.

Employees involved in the packaging, handling, storage, movement and use of hazardous materials or hazardous waste must be thoroughly familiar with the content of this handbook and put it to use in their daily work practice. Accordingly, you are encouraged to review this information periodically to refresh your memory and stimulate positive ways of making our workplace safer and your community a cleaner and more pleasant place to live.

This handbook is intended to be used in conjunction with DLA 4145.11, Storage and Handling of Hazardous Materials.

Any comments or suggestions for improving this handbook should be referred to the Defense Logistics Agency, ATTN:

J-3731, 8725 John J. Kingman Road, Stop 6233, Fort Belvoir, VA 22060-6221.

BY ORDER OF THE DIRECTOR

DANIEL G. MONGEON
Major General, USA

SAFETY

THINGS TO CHECK FOR SAFE AND COMPLIANT OPERATIONS



SAFETY AND HEALTH

ALWAYS ...
BE CAUTIOUS
WITH HAZARDOUS
MATERIALS



- Practicing good SAFETY MEASURES can help prevent accidents.
- This is a continuous part of your job and everyone in your work area must participate.
- Appropriate personal protective equipment can keep you healthy.

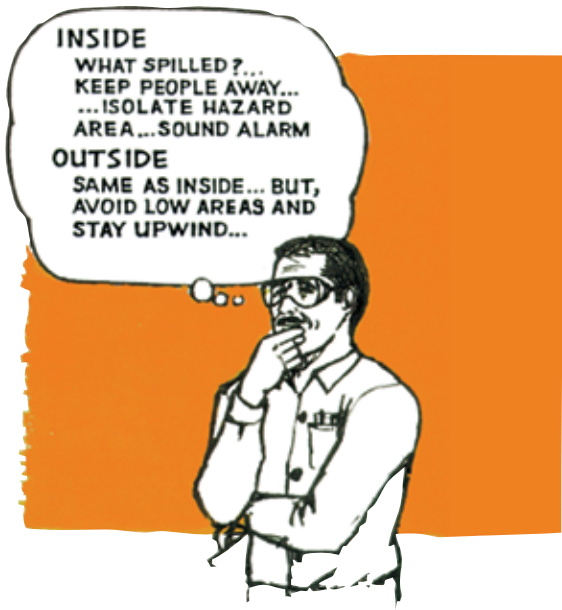
BE PREPARED



READ AND HEED !

- Know about the chemicals in your work area.
- Check labels for information.
- Check the Hazardous Materials Information Resource System (HMIRS) for the Material Safety Data Sheet (MSDS) and additional Product Information.
- It pays to know the specific hazards of the chemical you're handling.
- If you don't know – ASK!

THINK AHEAD



BE READY !!!

- Know what to do before an accident occurs.
- Think about your actions as you go about daily activities.
- When in doubt about a response procedure ask your supervisor.

LOOK OUT FOR PROBLEMS



- Report any unusual observations to your supervisor immediately!
- Examples:
 - Containers in bad condition.
 - Unusual odors.
 - Hidden leakers.
 - Labels torn, not readable, or missing.
 - Facility damages.
 - Equipment damages or malfunctions.
 - Concealed damages.

HANDLE HAZARDOUS MATERIALS CAREFULLY



- Pay attention at all times.
- Over-confidence, horseplay and carelessness can cause serious accidents.
- Be alert to your surroundings.
- Don't take shortcuts to make up for lost time.

STOW HAZARDOUS MATERIALS PROPERLY



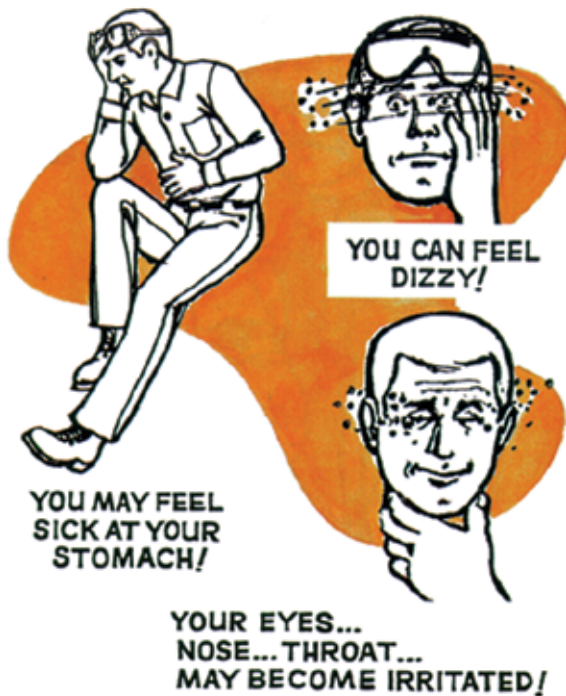
- Follow proper storage and handling procedures **PRECISELY.**
- Examples:
 - Face labels out.
 - Keep stacks straight and aligned.
 - Double check for location accuracy.
 - Don't stack too high.
 - Place materials carefully into location.
 - Avoid damage to chemical stocks.
 - Check for loose lids, caps and closures.
 - Place into proper location as soon as possible.
 - Don't store in the aisles.
 - Don't block exits or access to fire extinguishers.

KEEP YOUR WORK AREA CLEAN



- Housekeeping is a continuous job!
- Always maintain a clean uncluttered work area.
- Hazardous materials spill-cleanup is the responsibility of TRAINED professionals.
- Don't track around in spilled material.

EXPOSURE SYMPTOMS



- BE AWARE of these symptoms.
- NOTIFY your supervisor.

MUCH IS BEING
DONE TO PROTECT
YOU
FROM THE
HAZARDS
OF
STORING
AND
HANDLING
CHEMICAL
COMMODITIES

TAKE YOUR TRAINING SERIOUSLY



- SAFETY RULES and TRAINING have been designed to help keep you safe and your operation compliant.
- Practice SAFETY and POLLUTION PREVENTION at all times!

Refer to DLAI 4145.11 for HAZMAT Storage and Handling Policy.

RIGHT-TO-KNOW

KNOW YOUR HAZARD COMMUNICATION STANDARD

- Chemical manufacturers/importers must:
 - determine the physical and/or health hazards of each product they make;
 - communicate this information to users via Material Safety Data Sheets (MSDSs) and Hazard Warning Labels.
- The Hazardous Materials Information Resource System (HMIRS) is the DoD Central repository for the MSDSs and other information.
- Employers must develop a written hazard communication program that:
 - explains the hazard communication standard to the employees.
 - provides information and training on the chemicals in the workplace.
 - includes how to recognize, understand and use labels and MSDSs.



RIGHT-TO-KNOW



- Employees must read the labels and MSDSs and follow the instructions and warnings.
 - Be aware of chemical hazards on the job.
 - Know where to find and how to use chemical information.
 - Know how and when to use personal protective equipment.
 - Learn emergency procedures.
 - Practice sensible and safe work habits.
- It's your job to learn about the chemical hazards and protective measures provided for you in your training.

This handbook provides you with much of the information and guidance you need to know. Be familiar with it!

TRAINED PROFESSIONALS



- **TRAINED PROFESSIONALS** are working to help protect you and prevent possible problems.
- You should know the ones responsible for you and your work area.

PERSONAL PROTECTION

PERSONAL PROTECTION

KNOW YOUR PERSONAL PROTECTIVE EQUIPMENT



- Always wear the required personal protective equipment when handling hazardous materials.
- Report any equipment believed to be broken, worn out, or defective to your supervisor.
- Know the proper way to wear and use your equipment.
- If you are required to wear a respirator, make sure you are qualified.

EMERGENCY SHOWER AND EYE WASH

KNOW HOW TO USE YOUR EMERGENCY SHOWER AND EYE WASH STATION



- Know WHERE the nearest emergency shower and eye wash station is located.
- Call for help and summon for medical assistance.
- If chemicals splash on SKIN or CLOTHING rinse or shower thoroughly AND remove contaminated clothing. Drench for 15 MINUTES.
- If chemicals splash into EYES, hold the eyelids apart and roll the eyeballs around while flushing. Flush for 20 MINUTES.
- Report to the dispensary or health clinic immediately after washing or showering.

PERSONAL HYGIENE

PRACTICE GOOD PERSONAL HYGIENE AROUND CHEMICALS



- Wash hands, etc. thoroughly to remove chemical contaminants before eating.
- Keep your clothing clean.
- Wash hands, etc. to remove any chemical contaminants after handling chemical containers.
- Don't smoke.
- Do not store food or eat or drink in areas where chemicals are handled.

WORK ETHIC

PRACTICE GOOD WORKING HABITS



- Use the “Buddy” system; help each other.
- Assess the task at hand and identify any potential hazards and implement the appropriate safeguards before starting the task.
- Let others and your supervisor know of your work location in case you need emergency assistance.
- Protect containers against physical damage.
- Don’t try to repair damaged chemical containers without your supervisor’s approval.
- Never try to do jobs you are not trained for.

LIFTING

BE CAREFUL LIFTING CHEMICALS



- Chemicals may be **HEAVIER** than they seem.
- Never lift beyond your own strength. Get help!
- Lift gradually. Avoid jerky motions!
- Use the strength in your legs while keeping your arms and back straight up and down.
- Avoid working in awkward positions.
- Unsafe movement of chemical packages can lead to spills and released substances by dropping and breaking.

BLANK

SPILL CONTROL

BE ALERT

CHEMICAL SPILLS CAN OCCUR AT ANYTIME



- EXPOSURE to hazardous chemicals can occur when they are improperly packaged, transported, stored or handled.
- EXPOSURE can occur by:
 - Inhalation (breathing).
 - Ingestion (swallowing).
 - Skin absorption.
 - Skin and eye contact.
- Spills can occur for numerous reasons:
 - Rusted drums.
 - High storage temperatures.
 - Improper forklift maneuvering.
 - Unsecured or missing bung on drum.
- See PERSONAL PROTECTION section, pages 18-23.

DETECTING SPILLS

BE ON THE LOOKOUT FOR SPILLED MATERIAL AND DAMAGED CONTAINERS



- Early detection is critical.
- Spills can be detected by:
 - Unusual odors.
 - Wet packages or containers.
 - Small drips.
 - Sound of broken glass.
 - Loose lids, caps and closures.
 - Blowing chemical dusts.
- Observe carefully BEFORE:
 - Off-loading transport vehicles.
 - Handling packaged chemicals.
 - Entering enclosed spaces.

SPILL OR RELEASE

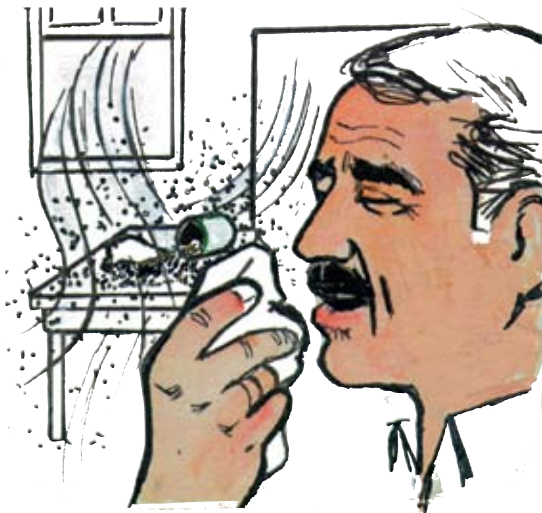
**KNOW WHAT TO DO WHEN CHEMICALS HAVE BEEN
SPILLED OR RELEASED FROM THEIR CONTAINERS**



- NOTIFY YOUR SUPERVISOR OR EMERGENCY RESPONSE COORDINATOR IMMEDIATELY!
- DO NOT TOUCH THE SPILLED MATERIAL!!!
- ATTEMPT TO:
 - Get information on the spilled material.
 - Control entry to the spill site.
 - Watch over the area until help arrives.

BREATHING HAZARDS

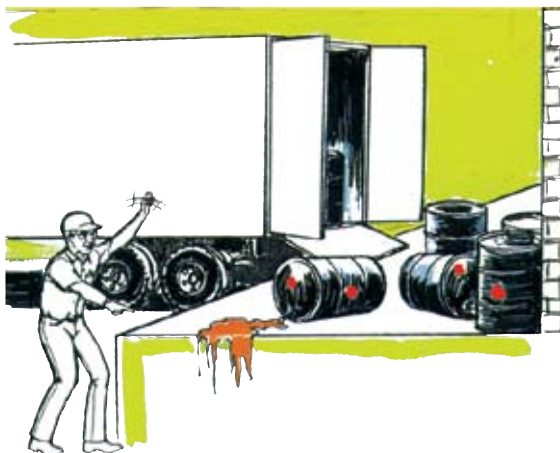
CHEMICAL DUSTS AND VAPORS CAN BE A SERIOUS PROBLEM



- PROTECT spills of hazardous dusts and powders from winds or strong drafts (e.g., close doors or cover the spill).
- When vapors or gases are detected, ventilate the area as much as possible (e.g., open doors). (DO NOT TURN ON ELECTRICAL FANS!!!)
- Avoid working in areas with strong chemical odors or dust.
- Clear people from the area until help arrives.
- Remain upwind of any spilled material.

SPILL RESPONSE

SEND FOR HELP! TAKE ACTION!



- In case of fire, follow fire response procedures. (See FIRE PREVENTION pages 91-100)
- Protect yourself. (See PERSONAL PROTECTION pages 19-23)
- Assist injured person if you can. (See RESCUE pages 35-52)
- Containment and cleanup of spilled material should be done by trained professionals.

SPILL CLEANUP

BE CAUTIOUS AROUND SPILLED CHEMICALS



- Do NOT attempt to clean up spills without proper training.
- Wear proper protective equipment when cleaning up or controlling a spill.
- Use impervious boots, gloves, aprons; eye and face protection; and proper respiratory protection in accordance with standard operating procedures and proper training.
- Stop the flow if you can safely.
- Control runoff by diking around liquid spills.
- Protect drainage to the water supply.

RESCUE

FIRST THOUGHTS



- Chemical spills can cause **SERIOUS** personal injury.
- A quick and proper response can save one's life.
- **DON'T PANIC!!**
- Protect yourself first, then help the best you can.

TAKE ACTION

FOLLOW RESCUE PROCEDURES FOR THE INJURED PERSON

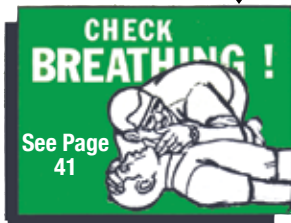


- Send for help and medical assistance immediately.
- Remain calm!
- Attend to the injured person in accordance with your training.
- Stay with the injured person until help arrives.
- Your actions in the first few moments of an incident can Save A Life.



**CHECK FOR
CONSCIOUSNESS**
See Page 40

IF UNCONSCIOUS



IF NOT BREATHING



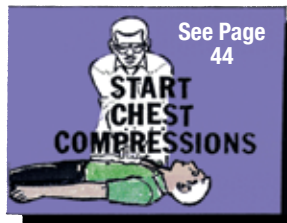
**CHECK
PULSE**

**IF NOT BREATHING
(But Has Pulse)**



See Page
46 & 47

IF NO PULSE



**IF NO PULSE
AND
NOT BREATHING**

RESCUE PROCEDURE

- Rescue persons shall be thoroughly trained before attempting these procedures.



RESCUE PROCEDURE FOR THE INJURED PERSON



WHEN THE INJURED PERSON IS IN IMMEDIATE DANGER

- Protect yourself first.
- Remain calm! Think!
- Help injured person to safety.

CAUTION! USE GOOD JUDGEMENT!
The injured person might have a
serious neck or back injury.

CHECK FOR CONSCIOUSNESS

IS THE INJURED PERSON CONSCIOUS?

- Find out!
 - TAP person's shoulder firmly.
 - SHAKE person gently.
 - SHOUT! "Are you okay?"
- No Response
 - CALL 911!
 - A conscious person will respond.



- If unconscious follow CHECK BREATHING step, see page 41.
- If not breathing start RESCUE BREATHING, see page 42.

IF UNCONSCIOUS



- Open the airway.
- Use the head-tilt/chin-lift method.
- Hold position.

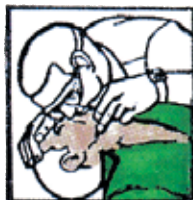


- Position your cheek close to victims' nose and mouth, look towards chest.
 - LOOK, LISTEN and FEEL for breathing.
 - Check for obstructed breathing for unconscious person, see page 47.
- Make sure the person is breathing for a minimum of 3.5 seconds between each breath before starting rescue breathing.
 - If no obstruction and not breathing START RESCUE BREATHING, see page 42.

IF NOT BREATHING



- Give two full breaths into victims mouth (use microshield).
- Allow chest to deflate after each breath.
- LOOK, LISTEN and FEEL for breathing again.
- If not breathing for 5-10 seconds, pinch victims' nose closed and give 2 full breaths into victim's mouth.
- If breaths won't go in, reposition head by tilting the head back slightly to open airways and try again to give breaths. If still blocked, perform abdominal thrusts.



IF NOT BREATHING BUT HAS PULSE

START MOUTH to MOUTH



- Hold head-tilt/chin-lift position.



- Pinch nose.
- Good mouth seal.
- Full lung inflation



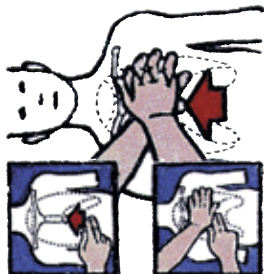
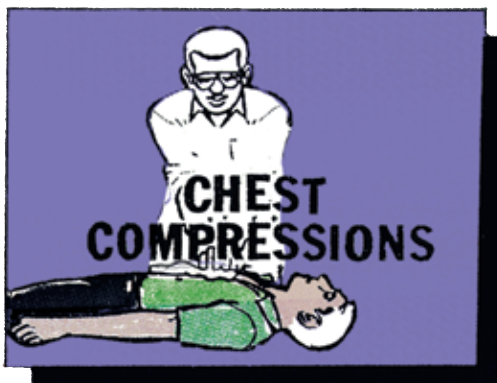
- Count: 1 and, 2 and, 3 and, 4 and, 5 and...

4

- Repeat starting with step 1 until breathing returns or help arrives.
- Check pulse periodically.

- If breathing is obstructed, see page 46.

IF NO PULSE



① HAND POSITION

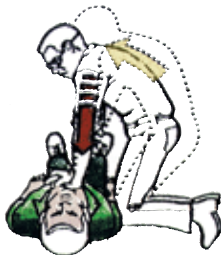
Establish proper hand position.



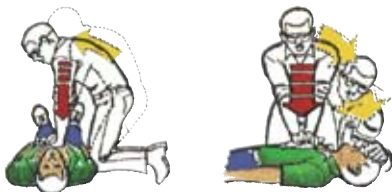
② COMPRESSION

Using heel of hand depress the chest no more than one inch and release smoothly.

- ③ Count out loud "one and two and, three and ..."
Compression rate = 80-100 per minute.

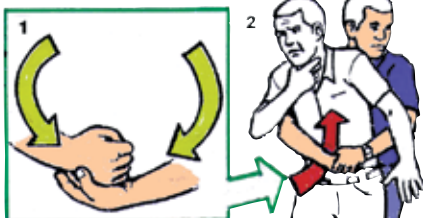


IF NO PULSE AND NOT BREATHING



- Combine mouth-to-mouth breathing and chest compressions.
- 1 CYCLE = two slow full breaths followed by 15 chest compressions.
- Repeat 4 cycles per minute.
- Recheck breathing and pulse.
- Continue above sequence repeatedly until breathing and pulse return or help arrives.
- Even if breathing and pulse returns, **DO NOT LEAVE THE PERSON.**
- If breathing is obstructed, see page 46.

IF BREATHING IS OBSTRUCTED



- If person can cough, speak, or breathe DO NOT INTERFERE.
- If you suspect person is choking, ask them or watch for them holding their hand over their throat.
- Perform abdominal thrusts.
 - Tell the person you're going to help them.
 - Make a fist (figure 1).
 - Grasp fist with other hand.
 - Press fist (thumb-side) into the abdomen (above navel; below rib cage) with a quick inward and upward thrust (figure 2).
- Repeat until object is expelled.

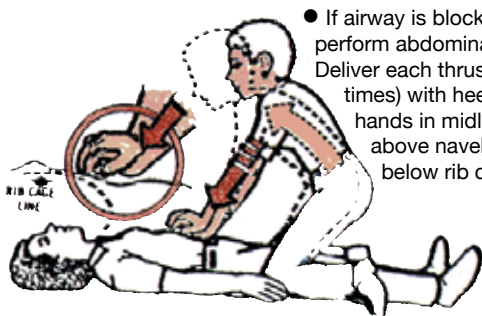
OBSTRUCTED BREATHING FOR UNCONSCIOUS PERSON



- Turn person on back; face up.
- Perform finger sweep to remove any foreign object.



- Attempt to ventilate by mouth.



- If airway is blocked perform abdominal thrusts. Deliver each thrust (6-10 times) with heel of hands in midline just above navel and below rib cage.

RESCUE PROCEDURE FOR A BURN HAZARD



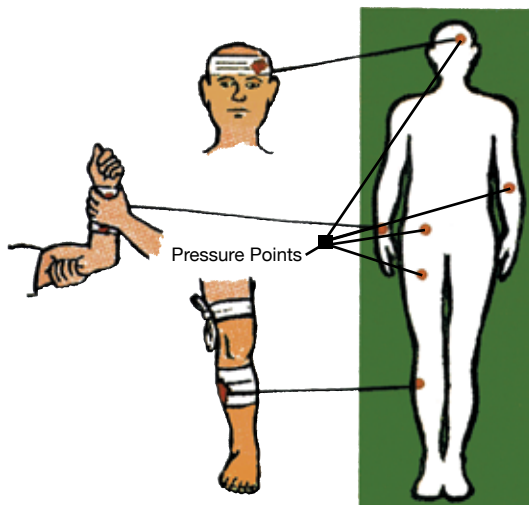
- Send for help immediately.
- Smother the fire with a blanket, your coat, or any other handy article.
- If necessary, smother the fire by rolling the person on the ground.
- Keep the person warm and calm.
- Stay with the injured person until help arrives.

RESCUE PROCEDURE FOR CHEMICAL INJURY



- Send for help immediately.
- HELP the injured person to an emergency shower or eye-wash station.
- HELP hold the eyelids apart or wash burning skin areas. Chemicals can cause the EYELIDS to SPASM CLOSED.
- Help in removing contaminated clothing safely, when feasible, and avoid contaminating oneself.
- Stay with injured person until help arrives.

RESCUE PROCEDURE FOR A BLEEDING INJURY



- Send for medical help quickly!
- Dangerous if a head injury or fracture is involved.
- If rubber gloves are available, put them on.
- Apply **DIRECT PRESSURE** to the site of bleeding and elevate.
- Use a compress (e.g., handkerchief) in the palm of your hand, or bare hand if necessary.
- If direct pressure and elevation does not stop bleeding, apply pressure to pressure points.
- Apply tourniquet as a last resort (life-threatening situation).
- Stay with the injured person until help arrives.

RESCUE PROCEDURE FOR A PERSON IN SHOCK



- Send for help (first responder/aid) immediately.
- Attend to the person involved.
 - Keep him/her CALM and COMFORTABLE.
 - SIT or LIE him/her down for a moment.
 - Let him/her RELAX and RECOVER.
 - Keep him/her WARM (but not hot).
 - Loosen any tight clothing.
- Be on the alert for developing problems (e.g., bleeding and breathing).
- Stay with the person until help arrives.
- Notify your and the injured person's supervisor, as well as the Safety Director.

FOLLOW THROUGH WITH PROPER MEDICAL ATTENTION

**COOPERATE WITH YOUR LOCAL
MEDICAL PERSONNEL**



- Medical programs are designed to help protect your HEALTH while on the job.
- Your cooperation is always important.

HAZARD PRECAUTIONS

RADIOACTIVE



Degree of hazard will vary depending on type and quantity of material.

HAZARDS/PRECAUTIONS

- Avoid touching broken or damaged radioactive items.
- Persons handling damaged items must wear rubber or plastic gloves.
- Damaged items will be monitored and safely packaged under the surveillance of the radiological monitor.
- Persons having come in direct contact with damaged or broken radioactive items should be moved away from the spill site, (but should stay in the area to be monitored and decontaminated).

CORROSIVE



Items include materials that cause destruction to human tissue and corrode metal (i.e., steel) upon contact.

HAZARDS/PRECAUTIONS

- Contact with corrosives causes burns to skin and eyes.
- May be harmful if inhaled.
- May produce poisonous fumes if exposed to a fire.
- May react violently with water.
- May ignite combustibles.
- Explosive gases may accumulate.
- Some chemicals will break down into corrosive or poisonous gases/fumes.

OXIDIZERS



These items are chemically reactive. A reaction with oxidizers will provide both heat and oxygen to support fire.

HAZARDS/PRECAUTIONS

- May ignite combustibles (wood, paper, etc.).
- Reaction with fuels may be violent.
- Fires may produce poisonous fumes.
- Vapors and dusts may be irritating.
- Contact may burn skin and eyes.
- Peroxides may explode from heat or contamination.
- Some oxidizers are corrosive.

EXPLOSIVE

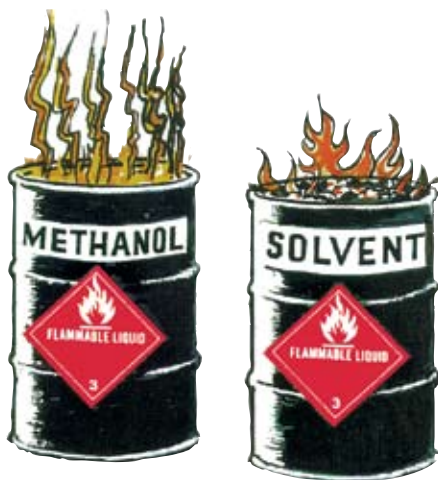


Some chemicals will explode in the presence of heat or flame.

HAZARDS/PRECAUTIONS

- Hazardous materials such as Flammable Liquids and Compressed Gases can react like explosive materials.
- No flares, smoking, flames, or sparks in a hazard area.
- May explode if dropped, heated, or sparked.

FLAMMABLE



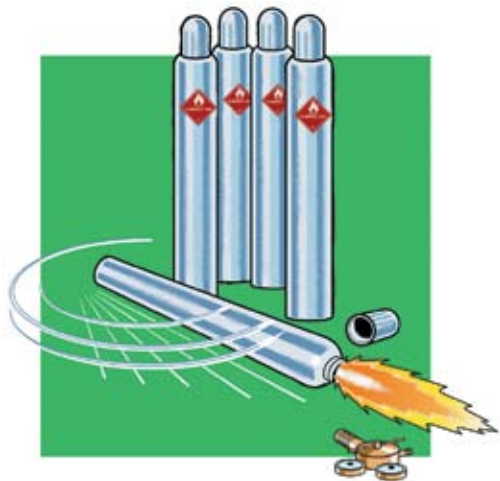
Flammable materials can:

- Burn rapidly.
- Give off intense heat.
- Produce heavy smoke.
- Spread rapidly to other areas.

HAZARDS/PRECAUTIONS

- No flares, smoking, flames, or sparks in the hazard area.
- Vapors are an explosion hazard.
- Can be poisonous; check labels.
- Some chemicals vaporize, making the work area unsafe.
- Vaporization is increased by elevated temperatures.

COMPRESSED GASES



Some chemicals are required to be stored in compressed gas cylinders.

HAZARDS/PRECAUTIONS

- Container may explode in heat or fire.
- Contact with liquid may cause frostbite.
- May be flammable, poisonous, explosive, irritating, corrosive or suffocating.
- May be EXTREMELY HAZARDOUS.
- Protect from direct sunlight.
- Ensure all cylinders are secured in storage and that the valve caps are in place.

LOW HAZARD



The primary factor influencing this hazard classification is how the material is stored.

HAZARDS/PRECAUTIONS

- Breathing air with these chemicals may be dangerous.
- Chemical contact may irritate skin and eyes.
- Chemical releases and improper disposal can pollute the environment.
- Avoid accumulating sufficient quantity that can cause a high-risk storage situation.

ORGANIC PEROXIDE



Some may be shock sensitive.

HAZARDS/PRECAUTIONS

- Some can react (decompose) rapidly producing a fire hazard.
- Some do not burn or react violently.
- Some burn as ordinary combustibles and react with little intensity.
- Excessively high and low temperatures can increase its hazard potential.

REACTIVE



Reactive chemicals are a FIRE HAZARD when exposed to water or air.

HAZARDS/PRECAUTIONS

- Water-reactive chemicals may ignite in presence of water.
- Spontaneously combustible chemicals may ignite when exposed to air.
- May re-ignite after fire is extinguished.
- Contact may burn skin and eyes.
- May be poisonous by skin contact.
- Inhalation of vapors may be harmful.
- Prohibit smoking in the area.

TOXIC/POISON



May cause death if breathed, swallowed or touched.

HAZARDS/PRECAUTIONS

- Look for the “Skull and Crossbones” on the label.
- Signal words to look for:
 - “Danger” Highly toxic
 - “Warning” Moderately toxic
 - “Caution” Low toxicity
- Some chemicals may cause cancer.
- Read the label carefully for storage and safety information.

HAZARD RECOGNITION

METHODS OF HAZARD RECOGNITION

- HAZARD WARNING LABELS on packages afford the same quick and easy recognition of hazards to warehouse personnel as is offered to the shippers.
- For complete details, refer to one or more of the following:
 - Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199. [All Modes]
 - International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air. [Air]
 - International Maritime Dangerous Goods Code (IMDG). [Water]
 - Canadian Transport Commission (CTC) Regulations. [Rail]
 - Preparing Hazardous Materials for Military Air Shipment (AFJMAN 24-204/TM38-250/NAVSUP P-505/MCO P4030.19H/DLAI 4145.3).
- The Hazard Characteristic Code (HCC) is assigned by people who are knowledgeable of the hazards and the Material Safety Data Sheets of items. The HCCs are defined in DLAI 4145.11 and reside in the Hazardous Materials Information Resource System (HMIRS) or one's local automated system.
- Special Markings and Manufacturer's Labeling.

RADIOACTIVE

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- A1 – Licensed.
- A2 – Licensed – Exempt.
- A3 – Licensed – Exempt, Authorized.

*NOTE

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

CORROSIVE

HAZARD WARNING LABEL



HAZARD CHARACTERISTICS CODES*

- B1, B2 – Alkali (Caustic).
- C1, C2 – Acid.
- C4, C5 – Acid, Corrosive oxidizer.

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

OXIDIZER

HAZARD WARNING LABEL



HAZARD CHARACTERISTICS CODES*

- D1 – Oxidizers.
- D2 – Oxidizer/Poison.
- D3 – Oxidizer/Acids.
- D4 – Oxidizer/Alkalies

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

EXPLOSIVE

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- E1 – Military explosives.
- E2 – Low-risk explosives.

* NOTE

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

FLAMMABLE

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- F1, F2, F3, F4 – Flammable liquids.
- F5 – Flammable liquids/Poisons.
- F6, F7 – Flammable liquids/Corrosive.
- F8 – Flammable solids.
- V2, V3 – Aerosols.
- V4 – Combustible liquids.

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

POISON (TOXIC)

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- K1 – Infectious.
- K2 – Cytotoxic.
- T1 – Poison by Inhalation.
- T7 – Carcinogenic.
- T2, T3 – Poison by Packing Groups I & II, respectively.
- T4 – Poison by Packing Group III.

*NOTE

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

COMPRESSED GAS

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- G1, G6, G7, G8, G9 – Poison gas.
- G2 – Flammable gas.
- G3, G4, G5 – Nonflammable gas.

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

**LOW HAZARD
(GENERAL PURPOSE)
HAZARD WARNING LABEL**



HAZARD CHARACTERISTICS CODES*

- | | |
|-------------------------------------|---|
| ● B3 – Alkali, low risk. | ● T5 – Pesticide, low risk. |
| ● C3 – Acid, low risk. | ● T6 – Health hazard. |
| ● E2 – Explosive, low risk. | ● V1 – Miscellaneous Hazardous Materials-class 9. |
| ● M1 – Magnetic Material. | |
| ● N1 – Not regulated as hazardous. | ● V5 – High flash point liquids, OSHA IIIA. |
| ● T4 – Poison, food contaminant. | ● V6 – Petroleum products. |
| ● Z1, Z2, Z3, Z4, Z5, Z7 – Article. | ● V7 – Environmental hazard. |

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

ORGANIC PEROXIDE

HAZARD WARNING LABEL



HAZARD CHARACTERISTICS CODES*

- P1 – Organic peroxide, DOT regulated.
- P1 – Organic peroxide, low risk.

***NOTE**

REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

REACTIVE

HAZARD WARNING LABELS



HAZARD CHARACTERISTICS CODES*

- R1 – Reactive chemicals, flammable (Pyrophoric).
- R2 – Water-reactive chemicals.
- Z6 – Article, battery, lithium.

*NOTE

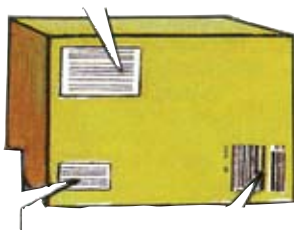
REFER TO DLAI 4145.11, Hazardous Materials Storage and Handling, for detailed definitions of the Hazard Characteristic Codes (HCCs).

HAZARDOUS MATERIALS PACKAGING AND MARKINGS

- Specification packaging vary considerably.



- Exterior Container Markings are essential.
 - NSN
 - CAGE/Part Number.
 - Item Identification.
 - Quantity and Unit of Issue.
 - Level of Pack/Date of Pack.
 - Weight/Cube.
 - Proper Shipping Name, UN/NA Number.



- Contract Number.

- Contractor Name.

- Contractor Address.

- Bar Code Markings.

Refer to DLAI 4145.3 Packaging of Hazardous Materials for further instructions.

SPECIAL MARKINGS

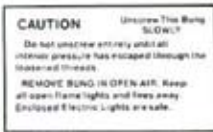
- Additional hazard markings that may appear on the package.



Magnetic Material
Label



Cargo Aircraft only
Label



Bung Label



Empty Label

Caution
Contains Asbestos Fibers Avoid
Creating Dust Breathing Asbestos
may Cause Serious Bodily Harm



SPECIAL MARKINGS

Polychlorinated Biphenyls (PCBs)



HAZARDOUS WASTE

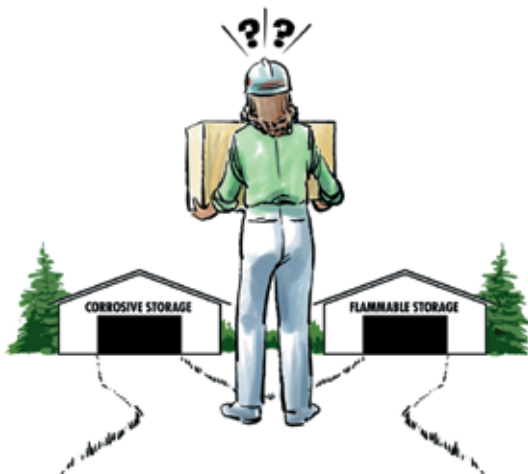


MANUFACTURER LABELING

- Hazard Communication label.
 - Applies to the hazards of all chemicals manufactured or imported.
 - Ensures that information on chemical hazards is properly transmitted.
 - Label Contents: Product identity, hazard warnings and name and address of the manufacturer, importer, or other responsible party.
- Pesticides
 - Applies to all pesticide products.
 - Label Contents: Product identity, producer/registrant data, net contents, product registration number, ingredients statement, warning or precautionary statement, directions for use and use classification.
- Review MSDS associated with Hazardous Warning Label for Product detail information as well as Emergency and/or Technical Assistance Phone Numbers.

STORAGE

PRIMARY STORAGE



PRIMARY STORAGE SEGREGATION CODES

A Radioactive	G Compressed Gas
C Corrosive	L Low Hazard (General Purpose)
D Oxidizer	P Organic Peroxide
E Explosive	T Poison (Toxic)
F Flammable	

- Each storage area (separate building or warehouse bay) must meet the Corps of Engineers, National Fire Protection Association standards required for its hazard.
- Segregation should be by physical means (e.g., walls or distance).
- Use the Hazard Characteristic Code (HCC) to segregate hazardous material storage areas (see page 87).

Refer to DLAI 4145.11, Storage and Handling of Hazardous Materials.

KEEP CHEMICALS SEGREGATED

INCOMPATIBLE MIXTURES CAN BE DANGEROUS

- | | |
|---|-------------------|
| • Ammonia + Bleach | = Noxious Fumes |
| • Acids + Cyanides | = Poison Gas |
| • Flammable Liquids +
Hydrogen Peroxide | = Fire/Explosion |
| • Acids + Oil or Grease | = Fire |
| • Methyl Ethyl Ketone Peroxide +
Any Contamination | = Fire/Gasing |
| • Acids + Caustics | = Heat/Spattering |
| • Caustics + Epoxies | = Extreme Heat |
| • Chlorine Gas + Acetylene | = Explosion |

These reactions may cause personal injury, death, property damage and adverse environmental impact.

- Avoid mixing incompatible chemicals.
- Separate or segregate incompatible chemicals.
- When in doubt, consult supervisors.
- Applies to solids, liquids and gases.

KNOW YOUR HAZARD CHARACTERISTICS!!

**FOLDED
INSERT**

Segregation within Primary Storage areas

A - Radioactive		
<u>Code</u>	<u>Name</u>	<u>Note</u>
A1	Radioactive, Licensed	A
A2	Radioactive, License Exempt	A
A3	Radioactive, License Exempt, Authorized	A
G - Gas, Compressed		
<u>Code</u>	<u>Name</u>	<u>Note</u>
G1	Gas, Poison	M
G2	Gas, Flammable	N
G3	Gas, Nonflammable	P
G4	Gas, Nonflammable, Oxidizer	R
G5	Gas, Nonflammable, Corrosive	S
G6	Gas, Poison, Corrosive	T
G7	Gas, Poison, Oxidizer	U
G8	Gas, Poison, Flammable	V
G9	Gas, Poison, Corrosive, Oxidizer	W
C - Corrosive		
<u>Code</u>	<u>Name</u>	<u>Note</u>
B1	Alkali, Corrosive, Inorganic	B
B2	Alkali, Corrosive, Organic	C
C1	Acid, Corrosive, Inorganic	D
C2	Acid, Corrosive, Organic	E
C4	Acid, Corrosive & Oxidizer, Inorganic	D
C5	Acid, Corrosive & Oxidizer, Organic	E
L - Low Hazard (General Purpose)		
<u>Code</u>	<u>Name</u>	<u>Note</u>
B3	Alkali, Low Risk	F
C3	Acid, Low Risk	F
E2	Explosive, Low Risk	A
M1	Magnetic Material	None
N1	Not Regulated as Hazardous	None
T4	Poison, Food Contaminant	BB
T5	Pesticide, Low Risk	None
T6	Health Hazard	None
V1	Miscellaneous Hazardous Materials - Class 9	None
V5	Hi-Flash Point Liquids, OSHA IIIB	None
V6	Petroleum Products	None
V7	Environmental Hazard	None
Z1	Article Containing Asbestos	None
Z2	Article Containing Mercury	None
Z3	Article Containing PCBs	None
Z4	Article, Battery, Lead Acid, Nonspillable	None
Z5	Article, Battery, Nickel Cadmium, Nonspillable	None
Z7	Article, Battery, Dry Cell	None

D - Oxidizer		
<u>Code</u>	<u>Name</u>	<u>Note</u>
D1	Oxidizer	None
D2	Oxidizer & Poison	G
D3	Oxidizer & Corrosive Acidic	G
D4	Oxidizer & Corrosive Alkali	G
P - Peroxide, Organic		
<u>Code</u>	<u>Name</u>	<u>Note</u>
P1	Peroxide, Organic, DOT Regulated	None
P2	Peroxide, Organic (Low Risk)	None
E - Explosive		
<u>Code</u>	<u>Name</u>	<u>Note</u>
E1	Explosive	H
R - Reactive		
<u>Code</u>	<u>Name</u>	<u>Note</u>
R1	Reactive Chemical, Flammable	Z
R2	Water-Reactive Chemical	AA
Z6	Article, Battery, Lithium	DD
F - Flammable		
<u>Code</u>	<u>Name</u>	<u>Note</u>
F1	Flammable Liquid DOT PG I, OSHA IA	J
F2	Flammable Liquid DOT PG II, OSHA IB	J
F3	Flammable Liquid DOT PG III, OSHA IC	J
F4	Flammable Liquid DOT PG III, OSHA II	J
F5	Flammable Liquid & Poison	L
F6	Flammable Liquid & Corrosive Acid	L
F7	Flammable Liquid & Corrosive Alkali	L
F8	Flammable Solid	K
V2	Aerosol, Nonflammable	EE
V3	Aerosol, flammable	EE
V4	DOT Combustible Liquid, OSHA IIIA	None
T - Poison		
<u>Code</u>	<u>Name</u>	<u>Note</u>
K1	Infectious Substance	X
K2	Cytotoxic Drugs	Y
T1	DOT Poison - Inhalation Hazard	None
T2	UN Poison, Packing Group I	None
T3	UN Poison, Packing Group II	None
T7	Carcinogen (OSHA, NIP, IARC)	CC
Notes apply to secondary segregation for storage within assigned primary areas		
DEFINITION OF NOTES		
NOTE A - Security Storage - must be well ventilated with limited access.		
NOTE B - Inorganic Alkali Storage - store away from acids by at least one 4 ft-aisle-width and away from organic alkalis by at least one 4 ft-aisle-width.		
NOTE C - Organic Alkali Storage - store away from acids by at least one 4 ft-aisle-width and away from inorganic alkalis by at least one 4 ft-aisle-width.		

NOTE D - Inorganic Acid Storage - store away from alkalis (caustics) by at least one 4 ft-aisle-width and away from organic acids by at least one 4 ft-aisle-width. Separate from other acids with subsidiary risk labels by at least one 4 ft-aisle-width.	
NOTE E - Organic Acid Storage - store away from alkalis (caustics) by at least one 4 ft-aisle-width and away from inorganic acids by at least one 4 ft-aisle-width. Separate from other acids with subsidiary risk labels by at least one 4 ft-aisle-width.	
NOTE F - Further separate into Acid and Alkali Storage within the low hazard storage area to keep potentially incompatible products from mixing.	
NOTE G - Separate from other oxidizers and oxidizers with secondary hazards by at least one 4 ft-aisle-width.	
NOTE H - Magazine Storage.	
NOTE J - Segregate into flammable liquid storage separate from flammable solids by at least one 4 ft-aisle-width.	
NOTE K - Segregate into flammable solid storage separate from flammable liquids by at least one 4 ft-aisle-width.	
NOTE L - Separate from other flammables and flammables with secondary hazards by at least one 4 ft-aisle-width.	
NOTE M - Further segregate into Poison Gas storage within compressed gas area.	
NOTE N - Further segregate into Flammable Gas storage within compressed gas area.	
NOTE P - Further segregate into Nonflammable Gas storage within compressed gas area.	
NOTE R - Further segregate into Oxidizer Gas within the Nonflammable Gas storage that is within the compressed gas area.	
NOTE S - Further segregate into Corrosive Gas within the Nonflammable Gas storage that is within the compressed gas area.	
NOTE T - Further segregate into Corrosive Gas within the Poison Gas storage that is within the compressed gas area.	
NOTE U - Further segregate into Oxidizer Gas within the Poison Gas storage that is within the compressed gas area.	
NOTE V - Further segregate into Flammable Gas within the Poison Gas storage that is within the compressed gas area.	
NOTE W - Further segregate into Corrosive and Oxidizer Gas within the Poison Gas storage that is within the compressed gas area.	
NOTE X - Further segregate into Biomedical storage within the Poison Gas Storage area.	
NOTE Y - Further segregate into a Medical Security storage within the Poison Gas Storage area.	
NOTE Z - Further segregate into a Spontaneously Combustible storage within the Reactive Storage area.	
NOTE AA - Should not store in areas protected with water sprinkler system. Fire protection should be nonwater based.	
NOTE BB - Store away from food.	
NOTE CC - Further segregation within Poison Gas Storage area may be necessary if secondary hazards exist (i.e., flammable, corrosive, etc.).	
NOTE DD - Separate from other products within the Reactive Storage area.	
NOTE EE - Store aerosols from flammables by placing in separate room or barrier such as floor-to-ceiling wire mesh, chain link fence, etc., to protect personnel from aerosols that can become self-propelled projectiles.	

FIRE PREVENTION

“CLASSES” OF FIRE



ORDINARY COMBUSTIBLES
(wood/paper/textiles...)



FLAMMABLE LIQUIDS
(gasoline/oils/grease...)



LIVE ELECTRIC
(wiring/generators/motors...)



COMBUSTIBLE METALS
(Finely divided form/chips/
turnings...)

**YOU MUST KNOW WHAT'S BURNING
BEFORE YOU GRAB THAT FIRE
EXTINGUISHER.**

**THEN SELECT THE RIGHT FIRE
EXTINGUISHER.**

USE WATER TYPE



FOR ORDINARY COMBUSTIBLE FIRES

- Class A fires burn deep below the surface. WATER cools and soaks in.
- Direct water stream at base of fire.

USE REGULAR DRY CHEMICAL TYPE



USE CO₂ TYPE Carbon Dioxide for electrical equipment fires and for flammable liquid fires.

- DO NOT use water on flammable liquid fires (SPLASHES/SPREADS) or electrical fires (SHOCK).
- APPLY DISCHARGE (DRY CHEMICAL or CO₂) using side-to-side motion.
- WHEN FIRE IS OUT CONTINUE TO DISCHARGE TO PREVENT REFLASH.
- ON ELECTRICAL FIRES...SHUT OFF power as soon as possible.

USE MULTI-PURPOSE DRY CHEMICAL TYPE



- For Ordinary Combustible Fires.
- For Flammable Liquid Fires.
- For Electrical Equipment Fires.

- CLASS A FIRES...coat exposed surfaces with dry chemical and stand by in case of rekindling.
- CLASS B AND C FIRES...apply dry chemical with a quick side-to-side motion. Allow discharge stream to fan out.

USE FOAM TYPE



- AVOID splashing fire - curve foam upward so it FALLS LIGHTLY.
- Blanket all surfaces with foam.



- Direct stream at floor or wall so foam spreads naturally onto fire. Move around for good coverage.

USE DRY POWDER TYPE EXTINGUISHANTS



For Combustible Metal Fires (These metals, in finely divided form, need special fire attack).

- Special Dry Powders are used for designated metals - may be applied by scoop, shovel or extinguisher.
- CLASS D FIRES burn with great intensity and must be controlled only with the proper dry powder.

FIRE RESPONSE



Action to take in case of fire.

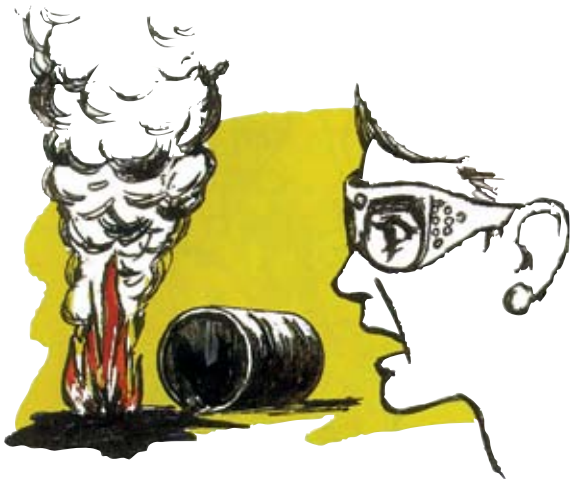
- Activate the emergency fire alarm at once! For any fire!
- THINK about what you can safely do BEFORE the emergency response team arrives.
 - What is burning?
 - Is it a SMALL FIRE that can be controlled with available extinguishers?
 - Is it a LARGE FIRE that is burning out of control?

IF THE FIRE IS SMALL



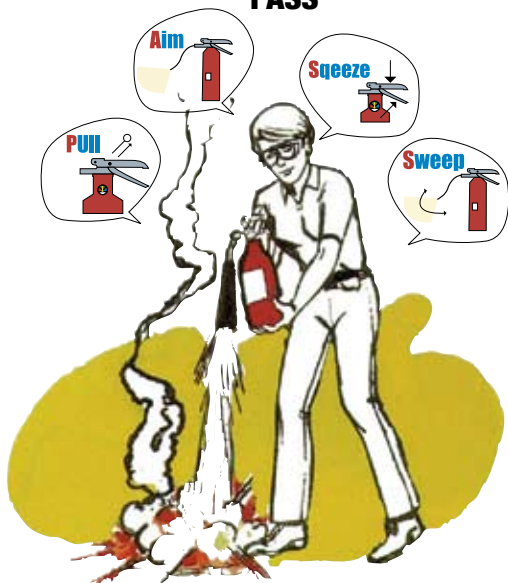
- **ACTIVATE FIRE ALARM** or notify **FIRE DEPARTMENT IMMEDIATELY!**
- If fire is still **SMALL...FIGHT IT!**
 - **HURRY...**these few moments are vital!
 - **PROTECT YOURSELF...**life safety first!
 - **SELECT** the right extinguisher...A,B,C,D?
 - **ATTACK** the fire properly...keep it from spreading!
 - **STAY** out of the heat and smoke!
 - **KEEP** near escape door...don't get trapped!
 - **DON'T** fight a fire alone...it's too risky!
- If fire gets **LARGE...get out!**

IF THE FIRE IS LARGE



- Activate Fire Alarm...(EVACUATE!) and notify fire department immediately!
- REMEMBER...life safety first!
- Don't use the extinguisher.
- Get yourself and others to safety.
- Remain a safe distance away.
- Close doors to fire area.
- Leave this fire fighting to the trained professionals.

PASS

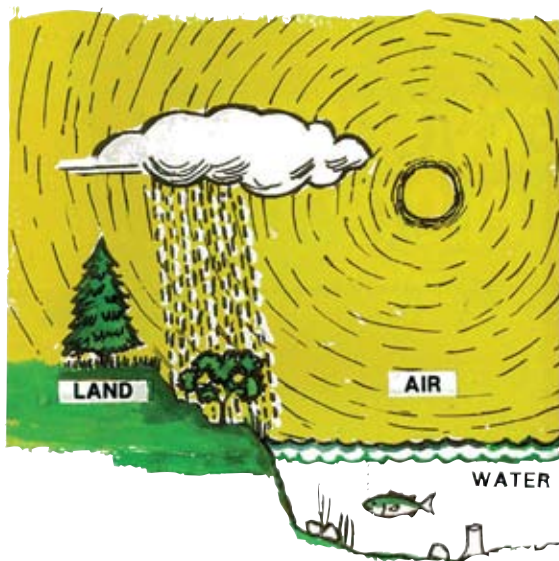


To operate a fire extinguisher, remember the word PASS

- Pull the pin. Hold the extinguisher with the nozzle pointing away from you, and release the locking mechanism.
- Aim low. Point the extinguisher at the base of the fire.
- Squeeze the lever slowly and evenly.
- Sweep the nozzle from side-to-side.

ENVIRONMENTAL PROTECTION

CLEAN ENVIRONMENT IS THE LAW



- Compliance with environmental laws, rules, and regulations IS PART OF THE MISSION, and must be built into all planning, preparation, and execution. **KNOW THE RULES THAT APPLY TO YOUR JOB. FOLLOW THEM.**
GET HELP FROM EXPERTS WHEN YOU NEED IT.
- Contamination of the environment with hazardous materials can be a legal offense, **PUNISHABLE BY LAW** with **FINES**.
- More importantly, we have a **MORAL OBLIGATION** to participate in keeping our community and working environment clean and safe for all future generations.
- Clean environment is everyone's responsibility.

DON'T POLLUTE THE WATER!!!



- CONTAMINATION of the water can affect the operation of your sewage treatment plant.
- Discharges to the water can destroy drinking and recreational waters.
- WATER POLLUTION can destroy fish, birds and other desirable wildlife.
- Water pollution is against the law!!!

DON'T POLLUTE THE AIR



- Don't burn debris/wastes from Chemical Storage Areas.
- Unauthorized burning of contaminated items can lead to the release of toxic fumes or gases and cause explosions.
- Open burning is against the law!!!

DON'T CONTAMINATE THE SOIL!!!



- DON'T dump hazardous materials on the soil!
- Chemical pollutants will be absorbed in the soil particles and dispersed in the environment by wind, water and mechanical means.
- ACCIDENTAL RELEASES should be removed as soon as possible by excavating the contaminated soil.
- Proper personal protection, handling and disposal procedures must be followed.

DON'T CONTAMINATE THE GROUNDWATER!!!



Improper Disposal can lead to Serious Land and Groundwater Pollution Problems.

- DON'T put hazardous materials into trash cans or dumpsters destined for sanitary landfills.
- Mixing with trash can cause fires and endanger disposal personnel.
- Store and handle all hazardous materials separately and in accordance with facility-permitting requirements.
- Improper disposal of hazardous materials is against the law!!!

MINIMIZE HAZARDOUS WASTE GENERATIONS



- Recycle/Reuse/Recover/Reclaim.
- Source Reduction:
 - Substitute with Safe and Environmentally Friendly Products.
 - Make Materials Handling Improvements.
 - Provide Employee Training.
 - Schedule needed Improvements.
 - Prevent Spills and Leaks.
 - Do Preventive Maintenance.
 - Improve Inventory Controls.
 - Segregate waste and stock items.
 - Increase Automation.
 - Minimize use of Water and Organic Solvents.

Every effort must be made to reduce the amount and toxicity of Hazardous Waste Material in your work area.



Practice Good Shelf Life Management and Storage Techniques to Prevent Generation of Hazardous Waste, Preclude Notices of Violation and Promote a Safe and Healthy Environment.

- Comply with shelf life policy in DOD 4140.27-M, Shelf Life Management Manual, and supplements, if issued by Service or Agency.
- Extend materiel through the Shelf Life Extension System.
- After extension, remark materiel using DD forms 2477.
- Get shelf life training.
- Contact your Service or Agency Shelf Life Program Administrator or use the Feedback on the web site for assistance.
- Above resources are available on the web site at www.shelflife.hq.dla.mil.
- Secure web site available to .mil customers.
- Do not over procure materiel.
- Report receipt of expired materiel by way of Supply Discrepancy Reports.
- Store material properly – maintain accurate inventory, rotate stock, issue material first-in-first-out, take prompt disposition on expired stock or extendible material requiring test or inspection.
- Use your Pharmacy, Hazardous Minimization Center, or HAZMAT Consolidation Center.

CONSERVE ENERGY



Reducing energy consumption saves money.

- Turn out lights that are not needed.
- Use energy efficient lighting.
- Reduce usage of hot water.
- Minimize facility heating and cooling.
- Reduce fuel consumption in vehicles.

NOTE

This handbook should be kept readily accessible for:

- Workplace Safety.
- Emergency Use
- Efficient Storage, Handling and Use of Hazardous Materials.
- Environmental Protection.
- Compliant Storage and Handling.



DEFENSE LOGISTICS AGENCY
Logistics Operations